PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Prior Group Art Unit: 2161

Mitsuaki OSHIMA et al. Prior Examiner: Thomas A. Dixon

Serial No.: Rule 1.53(b) Cont.
of Serial No. 09/886,130

Filed: September 28, 2001

For: OPTICAL DISK, OPTICAL RECORDER, OPTICAL REPRODUCER, CRYPTOCOMMUNICATION SYSTEM AND PROGRAM LICENSE SYSTEM

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Before examination of this continuing application, please amend the application as follows:

IN THE TITLE:

Please change the title to: A METHOD AND APPARATUS FOR ENCRYPTING AND RECORDING RECEIVED CONTENT INFORMATION ON A RECORDING MEDIUM USING BOTH MEDIUM IDENTIFICATION INFORMATION AND A CIPHER KEY FOR ENCRYPTION.

IN THE ABSTRACT:

Please cancel the originally filed Abstract and substitute therefor the Abstract attached hereto.

IN THE SPECIFICATION:

Page 1, after the heading "TECHNICAL FIELD," please cancel and insert:

The present invention relates to an disk or recording medium, disk or recording system and a cryptocommunication method.

Page 4, fourth full paragraph, replace with the following:

The present invention will be described on the basis of a number of embodiments. Herein, an additional recording area using the BCA system is referred to as a 'BCA area', and data recorded in a BCA is referred to as 'BCA data'. In addition, first identification data is referred to as 'ID' or 'disk ID'.

Page 5, second full paragraph, replace with the following:

As shown in Fig. 2a, a pulse laser 808 trims the reflecting aluminum films of the two-layer disk 801 in a BCA to record a stripe-like low reflection part 810 on the basis of a PE modulating signal. As shown in Fig. 2b, BCA stripes are formed on the disk. If the stripes are reproduced by a conventional optical head, the BCA has no reflecting signal. Therefore, as shown in Fig. 2c, gaps 810a, 810b and 810c are produced, where the modulating signal is missing. The modulating signal is sliced at the first slice level 915. But, the gaps 810a-c have a low signal level, and can therefore be sliced easily at the second slice level 916. As shown with the recorded and reproduced waveforms in Fig. 3a-3g, it is possible to reproduce the formed bar codes 923a and 923b by level-slicing them at the

second slice level 916 by a conventional optical pickup as shown in Fig. 3e. As shown in Fig. 3f, the waveforms of the codes are shaped by a LPF filter so as to PE-RZ decode the codes. As shown in Fig. 3g, a digital signal is output.

Page 5, third paragraph to Page 6 and Page 7 paragraph continued, replace with the following:

With reference to Fig. 4, the decoding operation will be explained. A disk 801 with a BCA includes two transparent substrates, which are laminated with a recording layer 801a between them. The recording layer may either be a single layer 801a or include two recording layers 800a and 800b. If there are two layers, a BCA flag 922 is recorded in the control data of the first recording layer 800a, which is adjacent to the optical head 6. The flag 922 indicates whether a BCA is recorded or not. Because a BCA is recorded in the second layer 800b, the first recording layer 800a is focused on first, and the optical head 6 is moved to the radial position of the control data 924 in the innermost edge of the second recording area 919. The control data is main data, and has therefore been Eight to Fourteen Modulation (EFM), 8-15 or 8-16 modulated. Only when the BCA flag 922 in the control data is '1', a single/double layer switching

part 827 focuses on the second recording layer 801b to reproduce the BCA. If the signal is sliced by a level slicer 590 at the general first slice level 915 as shown in Fig. 2c, it is converted into a digital signal. This signal is demodulated in the first demodulation part by an EFM demodulator 925, an 8-15 modulator-demodulator 926 or an 8-16 modulator-demodulator 927. An ECC decoder 36 corrects errors, if any, and outputs main data. The control data in the main data is reproduced and only if the BCA flag 922 is 1 is the BCA read. When the BCA flag 922 is 1, a CPU 923 orders the single/double layer switching part 827 to drive a focus adjustment part 828, switching the focus from the first recording layer 800a to the second recording layer 801b. At the same time, the optical head 6 is moved to the radial position of the second recording area 920, that is, for the DVD standard, the BCA is recorded between 22.3 and 23.5 mm from the inner edge of the control data. Then the BCA is read. Reproduced in the BCA area is a signal with a partially missing envelope as shown in Fig. 2c. By setting in the second level slicer 929 the second slice level 916 of which the quantity of light is smaller than that of the first slice level 915, it is possible to detect the missing parts of the reflecting portion of the BCA, and a digital signal is output. This signal is PE-RZ demodulated by the second demodulation part 930, and ECC decoded

by an ECC decoder 930b so as to output BCA data, which is auxiliary data. Thus, the first demodulator 928, operative according to, 8-16 modulation demodulates and reproduces the main data, while the second demodulation part 930 operative according to PE-RZ modulation demodulates and reproduces the auxiliary data, that is, the BCA data.

Page 22, second full paragraph, cancel and replace with:

For another application, at Process 3, an enciphered or scrambled MPEG picture signal and/or other data is recorded on a disk 944e. The operation of the MPEG scramble will not be explained in detail. At Process 4, the software company makes a disk 844f in which a sub-public key for decoding the ID number and the scramble release data have been BCA-recorded secondarily. It is not possible to replay this disk solely. At Process 5, the selling store, after receiving the money for the disk, makes a password with the sub-secret key paired with the sub-public key, and records it tertiarily on the disk. Alternatively, a receipt on which the password has been printed is given to the user. Thereafter, the password has been recorded in the dis 844g, so that the user can replay it. This method prevents a disk not

paid for from being replayed normally, even if the disk is shoplifted, because the scramble of the image is not released. As a result, shoplifting yields a useless product, and thus decreases.

IN THE CLAIMS:

Please cancel claim 1-28 without prejudice or disclaimer.

Please add the following new claims 29-34 as follows:

29. (New) An information recording device for recording information on an optical disk comprising a first recording area and a second recording area, said device comprising:

means for recording information using a first modulation method into a first recording area of such an optical disk;

means for reading disk identification information recorded by a second modulation method in a second recording area of the optical disk said means including an optical head which is also capable of reading of reading information recorded in the first recording area; and

means for encrypting information using at least both a cipher key and said disk identification information unique to the

optical disk, into encrypted information unique to the same optical disk, and

means for permitting recording of said encrypted information by said means for recording after confirming the content of a recording permission code in an input signal to said means for recording.

30. (New) The information recording device of claim 29, wherein said means for recording information uses 8-16 modulation as said first modulation method.

31. (New) The information recording device of claim 29, wherein the means for reading disk identification information includes means for demodulating information modulated using phase encoded (PE) modulation as said second modulation method.

32. (New) The information recording device of claim 29, wherein said means for recording information uses 8-16 modulation as said first modulation method, and said means for reading disk identification information includes means for demodulating information modulated using phase encoded (PE) modulation as said second modulation method.

33. (New) The information recording device of claim 29, wherein said disk identification information recorded in said second recording area of an optical disk comprises circumferentially arranged multiple stripe patterns each stripe of which extends along a radius of the optical disk.

34. (New) The information recording device of claim 29, wherein said second recording area is disposed within said first recording area.

REMARKS

This application is a Rule 1.53(b) Continuation Application of Serial No. 09/886,130, filed June 22, 2001.

Claim 29-34 are presented herein as the only claims for examination in this continuing application.

The title, abstract and specification have been amended in the same manner as in the parent application and to identify the parent application.

Filed herewith is an Information Disclosure Statement listing all references cited during prosecution of the parent application.

Prompt and favorable examination of this application on the merits is respectfully solicited.

Respectfully submitted,

PARKHURST & WENDEL, L.L.P.

September 28, 2001
Date

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Attachments:
New Abstract
Mark Up of Amended Specification

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ABSTRACT OF THE DISCLOSURE

A content recording method using a communication means, including reading from a recording medium identification information unique to that recording medium, receiving through the communication means permission information for permitting recording of content on that recording medium, receiving content information through the communication means, and after confirming validity of the permission information, encrypting the received content information using both the unique identification information and a cipher key, and recording the encrypted content information on the recording medium.

TITLE OF THE INVENTION

Optical Disk, Optical Recorder, Optical Reproducer, Cryptocommunication System and Program License System

TECHNICAL FIELD

~~The present invention relates to an optical disk, an optical disk system and a cryptocommunication method~~ The present invention relates to an disk or recording medium, disk or recording system and a cryptocommunication method.

BACKGROUND

In recent years, with the increased use of networks such as the Internet and optical CD ROM disks, network soft key distribution for optical ROM disks has increased. Also, electronic commercial transactions have increased.

Soft key electronic distribution systems for CD-ROM media have been used. In conventional systems, it is known to give passwords and decipher the enciphered soft ciphers recorded on the CD-ROMs in advance. When CD-ROMs are used, however, it is not possible additionally to record on the disks, so that it is not possible to individually set IDs for respective disks. Therefore, one password would release the ciphers of all the disks manufactured from the same original disk. For this reason, when CD-ROMs are used, it is necessary to install the disks' IDs on the hard disks of personal computers, or mail to users IDs prepared centrally.

In electronic distribution systems with conventional optical disks and/or optical disk systems, there is a need to provide the disks and/or systems with IDs and/or cipher keys. It is an object of the present invention to simply provide IDs and cipher keys for ROM disks in electronic distribution systems.

SUMMARY OF THE INVENTION

To achieve the objects of the present invention, the pit portions of optical disks are provided with an additional recording area or Burst Cutting Area (hereinafter abbreviated as

the aforementioned drawings, that listing being in consecutive numerical order of the reference numerals.

DETAILED DESCRIPTION OF THE INVENTION

The present invention will be described on the basis of a number of embodiments. Herein, an additional recording area using the BCA system is referred to as a 'BCA area', and data recorded in a BCA is referred to as 'BCA data'. In addition, first identification data is referred to as 'ID' or 'disk ID'.

Fig. 1 shows a typical process for producing a disk with a BCA. The first cipher key 802, such as a public key, is used by a cipher encoder or scrambler 803 to encipher contents 777 into the first cipher 805. An 8-16 modulator 917, such as a mastering unit, modulates the first cipher 805. A laser records the modulated signal as pits in the first recording area 919 of an original disk 800. A molding machine 808a uses the original disk 800 to mold disk-like transparent substrates (not shown). A reflecting film making machine 808b forms reflecting Al films, and makes single-sided disks 809a and 809b which are each 0.6 millimeter thick. A bonding machine 808c laminates these disks together to make a completed disk 809. A trimming unit 807 modulates the disk ID 921, the first cipher decoding key 922, or the second cipher key 923 for Internet communication in the second recording area 920 of the completed disk 809, with a Phase Encoding-Return to Zero (PE-RZ) modulator 807a, which combines PE modulation and RZ modulation. A pulse laser 807b effects BCA trimming to make a disk 801 with a BCA. Because laminated disks are used, it is not possible to alter the BCA inside, and thus the completed disk can be used for security.

A BCA will next be explained briefly.

As shown in Fig. 2a, a pulse laser 808 trims the reflecting aluminum films ~~809~~ of the two-layer disk ~~800~~ 801 in a BCA to record a stripe-like low reflection part 810 on the basis of a PE modulating signal. As shown in Fig. 2b, BCA stripes are formed on the disk. If the stripes are reproduced by a conventional optical head, the BCA has no reflecting signal. Therefore, as shown in

Fig. 2c, gaps 810a, 810b and 810c are produced, where the modulating signal is missing. The modulating signal is sliced at the first slice level 915. But, the gaps 810a-c have a low signal level, and can therefore be sliced easily at the second slice level 916. As shown with the recorded and reproduced waveforms in Fig. ~~3~~ 3a-3g, it is possible to reproduce the formed bar codes 923a and 923b by level-slicing them at the second slice level 916 by a conventional optical pickup as shown in Fig. 3e. As shown in Fig. 3f, the waveforms of the codes are shaped by a LPF filter so as to PE-RZ decode the codes. As shown in Fig. 3g, a digital signal is output.

With reference to Fig. 4, the decoding operation will be explained. A disk 801 with a BCA includes two transparent substrates, which are laminated with a recording layer 801a between them. The recording layer may either be a single layer 801a or include two recording layers 800a and 800b. If there are two layers, a BCA flag 922 is recorded in the control data of the first recording layer 800a, which is adjacent to the optical head 6. The flag 922 indicates whether a BCA is recorded or not. Because a BCA is recorded in the second layer 800b, the first recording layer 800a is focused on first, and the optical head 6 is moved to the radial position of the control data 924 in the innermost edge of the second recording area 919. The control data is main data, and has therefore been Eight to Fourteen Modulation (EFM), 8-15 or 8-16 modulated. Only when the BCA flag 922 in the control data is '1', a single/double layer switching part 827 focuses on the second recording layer 801b to reproduce the BCA. If the signal is sliced by a level slicer 590 at the general first slice level 915 as shown in Fig. 2c, it is converted into a digital signal. This signal is demodulated in the first demodulation part by an EFM demodulator 925, an 8-15 modulator-demodulator 926 or an 8-16 modulator-demodulator 927. An ECC decoder 36 corrects errors, if any, and outputs main data. The control data in the main data is reproduced and only if the BCA flag 922 is 1 is the BCA read. When the BCA flag 922 is 1, a CPU 923 orders the single/double layer switching part 827 to drive

a focus adjustment part 828, switching the focus from the first recording layer ~~801a~~800a to the second recording layer 801b. At the same time, the optical head 6 is moved to the radial position of the second recording area 920, that is, for the DVD standard, the BCA is recorded between 22.3 and 23.5 mm from the inner edge of the control data. Then the BCA is read. Reproduced in the BCA area is a signal with a partially missing envelope as shown in Fig. 2c. By setting in the second level slicer 929 the second slice level 916 of which the quantity of light is smaller than that of the first slice level 915, it is possible to detect the missing parts of the reflecting portion of the BCA, and a digital signal is output. This signal is PE-RZ demodulated by the second demodulation part 930, and ECC decoded by an ECC decoder 930b so as to output BCA data, which is auxiliary data. Thus, the first demodulator 928, operative according to, 8-16 modulation demodulates and reproduces the main data, while the second demodulation part 930 operative according to PE-RZ modulation demodulates and reproduces the auxiliary data, that is, the BCA data.

Fig. 5a shows the reproduced waveform before passage through a filter 943. Fig. 5b shows the working size accuracy (precision) of the slits of the low reflecting portion 810. It is difficult to make the slit width less than 5mm. In addition, if the data is not recorded inward radially from 23.5 mm, it will not be properly reproduced. Therefore, for a DVD, because of the limitations of the shortest recording cycle of 30 mm and the maximum radius of 23.5 mm, the maximum capacity after formatting is limited to 188 bytes or less.

The modulating signal is recorded as pits by the 8-16 modulation mode, and a high frequency signal such as the high frequency signal part 933 in Fig. 5a is obtained. However, the BCA signal is a low frequency signal like low frequency signal part 932. Thus, if the main data complies with the DVD standard, it is a high frequency signal 932 which is about 4.5 MHz or less, shown in Fig. 5a, and the auxiliary data is a low frequency signal 933 which is 8.92 ms in period, that is, about 100 kHz. It is

The method of using a BCA will be stated by which secondary recording and tertiary recording, too, can be made by the BCA method. As shown at Process 2 in Fig. 15, a software maker can also secondarily record a pirated edition prevention mark and a check cipher. At Process 2, disks 944b may be made in which different ID numbers and/or cipher keys for secret communication with users have been recorded. It is possible to replay the disks 944c and 944d without entering the passwords.

For another application, at Process 3, an enciphered or scrambled MPEG picture signal and/or other data is recorded on a disk 944e. The operation of the MPEG scramble will not be explained in detail. At Process 4, the software company makes a disk 844f in which a sub-public key for decoding the ID number and the scramble release data have been BCA-recorded secondarily. It is not possible to replay this disk solely. At Process 5, the selling store, after receiving the money for the disk, makes a password with the sub-secret key paired with the sub-public key, and records it tertiarily on the disk. Alternatively, a receipt on which the password has been printed is given to the user. Thereafter, the password has been recorded in the disk 844g, so that the user can replay it. This method prevents a disk not paid for from being replayed normally, even if the disk is shoplifted, because the scramble of the image is not released. As a result, shoplifting ~~renders~~ yields a useless product, and thus decreases.

If a password is BCA-recorded permanently in a rental video store or another store, a shoplifted disk can be used. In this case, as shown at Process 6, the BCA is read by a POS bar code reader in the store. A password for releasing the scramble is issued at Step 951g, printed on the receipt at Step 951i, and handed to the customer at Step 951j. The customer enters, at Step 951k, the password on the receipt in a player with numeric keys at his/her house. At Step 951p, the disk is replayed for a predetermined number of days. If a user rents a disk, given a password for only part of the software in the disk, and when he/she wants to view other part of the software, he/she can replay it by being informed of the password for this part by telephone at